

IV. REMARKS

The claims are rejected under 35 U.S.C. 112. The claims are amended to obviate the rejection. Withdrawal of the rejection is respectfully requested.

Claims 1-9 and 18-20 are rejected under 35 U.S.C. 102(a) as anticipated by Lum (U.S. Patent No. 5,959,462). The rejection is respectfully traversed.

Lum teaches a test structure for enabling burn-in testing on an entire semiconductor wafer. As shown in the Figs. 4-7, Lum teaches a semiconductor device 10 that includes a semiconductor chip 28, a protective resin 36 and an external connecting terminal.

Claim 1 is directed to a semiconductor device that includes a semiconductor chip having an active surface and an inactive surface disposed opposite the active surface; protective resin covering a sidewall of the semiconductor chip and having a surface formed so as to be flush with the inactive surface of the semiconductor chip; a board having a surface on which the semiconductor chip is mounted; and an external connecting terminal joined to a surface of the board that is facing away from the semiconductor chip, the external connecting terminal being electrically connected to the active surface of the semiconductor chip. Claim 1 further recites that the protective resin is permanently joined to the surface of the board and the external connecting terminal is permanently joined at the opposite surface of the board.

It is respectfully submitted that the rejection is improper because the applied art fails to teach each element of claim 1. Specifically, the applied art fails to teach a protective resin is permanently joined to the surface of the board and an external connecting terminal is permanently joined at the opposite surface of the board. Thus, it is respectfully submitted that claim 1 is allowable over the applied art.

Claim 7 is directed to a semiconductor device that includes a board having a mounting surface and an opposite surface; a semiconductor chip having an active surface and an inactive surface which is a surface on the opposite side of the active surface with the semiconductor chip being joined to the board in a state where the active surface thereof is facing to the board and the inactive surface thereof is exposed;

a protective resin covering a sidewall of the semiconductor chip and having a surface formed so as to be flush with and in active surface of the semiconductor chip; and, an external connecting terminal joined to a surface of the board that is facing away from the semiconductor chip, the external connecting terminal being electrically connected to the active surface of the semiconductor chip. Claim 7 recites that the protective resin is permanently joined to the mounting surface of the board and the external connecting terminal is permanently joined at the opposite surface of the board.

It is respectfully submitted that the rejection is improper because the applied art fails to teach each element of claim 7. Specifically, the applied art fails to teach a protective resin is permanently joined to the mounting surface of the board and an external connecting terminal is permanently joined at the opposite surface of the board. Thus, it is respectfully submitted that claim 7 is allowable over the applied art.

Claim 18 is directed to a semiconductor device that includes a semiconductor chip having an active surface and an inactive surface disposed opposite the active surface; a board having a surface on which the semiconductor chip is mounted; an external connecting terminal permanently joined at a surface of the board that is facing away from the semiconductor chip, the external connecting terminal being electrically connected to the active surface of the semiconductor chip and projecting therefrom; an underfill resin surrounding the external connecting terminal to form an outer peripheral underfill resin surface and covering at least a portion of the active surface; and a protective a resin covering a sidewall of the semiconductor chip and the outer peripheral underfill resin surface with the protective resin having a surface formed so as to be flush with the inactive surface of the semiconductor chip. Claim 18 recites that the protective resin is permanently joined to the surface on which the semiconductor chip is mounted.

It is respectfully submitted that the rejection is improper because the applied art fails to teach each element of claim 18. Specifically, the applied art fails to teach an external connecting terminal permanently joined at a surface of the board and the protective resin is permanently joined to the surface on which the semiconductor chip is

mounted. Thus, it is respectfully submitted that claim 18 is allowable over the applied art.

Claim 19 is directed to a semiconductor device that includes a board; a semiconductor chip joined to the board in a state where its active surface is opposite to the board and its inactive surface which is a surface on the opposite side of the active surface is exposed; an external connecting terminal permanently joined at a surface of the board that is facing away from the semiconductor chip, the external connecting terminal being electrically connected to the active surface of the semiconductor chip and projecting therefrom; an underfill resin surrounding the external connecting terminal to form an outer peripheral underfill resin surface and covering at least a portion of the active surface; and a protective resin covering a sidewall of the semiconductor chip and the outer peripheral underfill resin surface with the protective resin having a surface formed so as to be flush with the inactive surface of the semiconductor chip and being permanently joined to the surface on which the semiconductor chip is mounted.

It is respectfully submitted that the rejection is improper because the applied art fails to teach each element of claim 19. Specifically, the applied art fails to teach an external connecting terminal permanently joined at a surface of the board and the protective resin is permanently joined to the surface on which the semiconductor chip is mounted. Thus, it is respectfully submitted that claim 19 is allowable over the applied art.

Claim 20 is directed to a semiconductor device that includes a semiconductor chip having a flat inactive surface and a flat opposite active surface with a sidewall extending peripherally about the semiconductor chip and between the active surface and the inactive surface; a circuit board having a flat contacting surface disposed apart from and facially opposing the active surface of the semiconductor chip and an opposite surface; a plurality of bumps interposed between the semiconductor chip and the circuit board for electrically connecting the active surface of the semiconductor chip and the contacting surface of the circuit board and forming a clearance among the plurality of bumps and between the active surface of the semiconductor chip and the contacting surface of the circuit board with the plurality of bumps being permanently joined at the

opposite surface of the circuit board; an underfill resin disposed between the active surface of the semiconductor chip and the contacting surface of the circuit board for filling the clearance; and a protective resin covering an outer peripheral surface of the underfill resin and the sidewall thereby surrounding the semiconductor chip and the outer peripheral surface of the underfill resin with the protective resin being in contact with and extending from the contacting surface of the circuit board to the inactive surface of the semiconductor chip to form a protective resin surface flush with the inactive surface and being permanently joined to the flat contacting surface on which the semiconductor chip is mounted.

It is respectfully submitted that the rejection is improper because the applied art fails to teach each element of claim 20. Specifically, the applied art fails to teach the plurality of bumps being permanently joined at the opposite surface of the circuit board and the protective resin being permanently joined to the flat contacting surface on which the semiconductor chip is mounted. Thus, it is respectfully submitted that claim 20 is allowable over the applied art.

Claims 2 and 4-6 depend from claim 1 and include all of the features of claim 1. Claims 8 and 9 depend from claim 7 and include all of the features of claim 7. It is respectfully submitted that the dependent claims are allowable at least for the reasons the independent claims are allowable as well as for the features they recite.

Withdrawal of the rejection is respectfully requested.

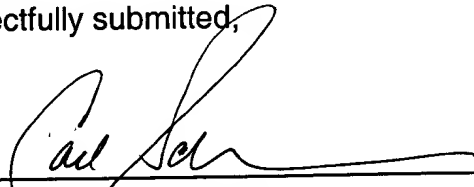
In view of the foregoing, reconsideration of the application and allowance of the pending claims are respectfully requested. Should the Examiner believe anything further is desirable in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' representative at the telephone number listed below.

Should additional fees be necessary in connection with the filing of this paper or if a Petition for Extension of Time is required for timely acceptance of the same, the Commissioner is hereby authorized to charge Deposit Account No. 18-0013 for any such fees and Applicant(s) hereby petition for such extension of time.

Respectfully submitted,

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By: _____


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Enclosure(s): Petition for Extension of Time (one month)

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